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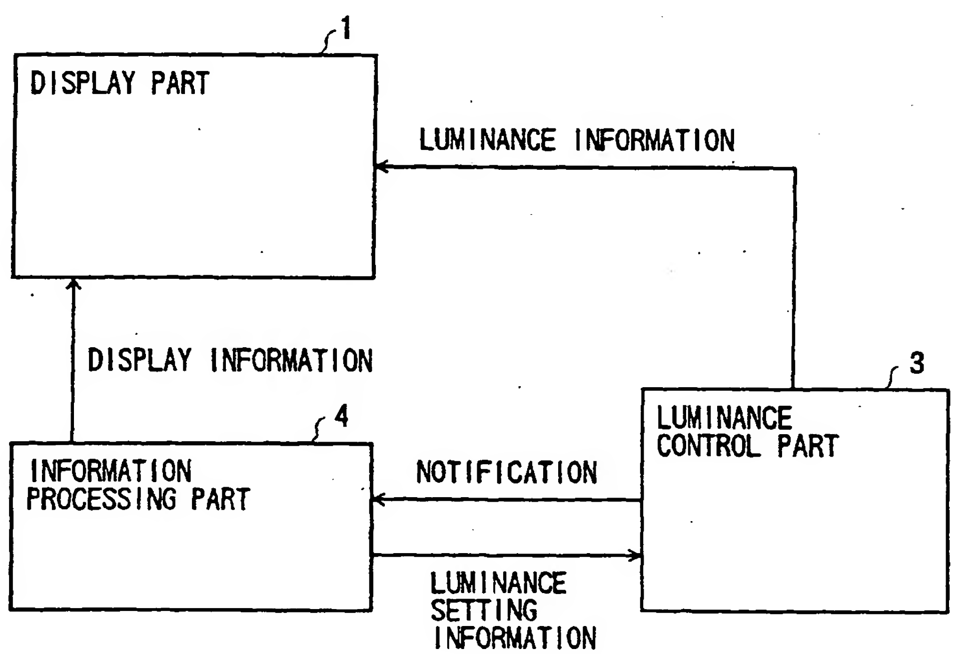
(54) Display control method and information processing apparatus

(57) In a display unit, a luminance of a display part (1) having a luminance adjusting function is gradually decreased from a maximum luminance value to a minimum luminance value with lapse of time, even during an operation other than a luminance adjusting operation.

FIG. 1



EP 0 911 799 A2

Description

BACKGROUND OF THE INVENTION

[0001] The present invention generally relates to display control methods and information processing apparatuses, and more particularly to a display control method suited for controlling a display part which is driven by a batter and to an information processing apparatus which uses such a display control method.

[0002] Recently, it has become popular to use portable information processing apparatuses. Since the portable information processing apparatuses typified by laptop personal computers and portable communication equipments are powered by a battery when carried, and there are demands to minimize the power consumption so as to extend the serviceable life of the battery. Conventionally, in order to reduce the power consumption, a clock frequency of a central processing unit (CPU) is reduced, a motor which rotates a recording medium such as a magnetic disk is stopped or, the luminance of a back light of a liquid crystal display (LCD) is reduced. However, depending on the state of use of the information processing apparatus, inconveniences are introduced due to the measures taken to reduce the power consumption, and thus, there are demands to prevent the inconveniences such as reduced processing speed and poor operation characteristic of the information processing apparatus.

[0003] In a case where the LCD is used for a display part, it is desirable to provide a back light part so as to facilitate viewing of the liquid crystal display. But when the back light part is provided, the power consumption required for the display increases, and the serviceable life of the battery is shortened in the case of a portable information processing apparatus which uses the battery as the power supply. For this reason, the luminance adjustment of the display part is conventionally made manually by the user by taking into consideration the life of the battery according to a first method or, the luminance of the display part is forcibly set to a minimum luminance value according to a second method. However, when the first method is used, the user must constantly be aware of the life of the battery and manually adjust the luminance of the display part, thereby complicating the operation of the information processing apparatus. On the other hand, when the second method is used, the display is difficult to see if the minimum luminance value is small, but the effect of reducing the power consumption is small if the minimum luminance value is relatively large.

[0004] Accordingly, when the first method is used, there were problems in that the operation of the information processing apparatus becomes complicated and the operation characteristic of the information processing apparatus becomes poor. In addition, when the second method is used, there were problems in that the display is difficult to see if the minimum luminance value is small, and the effect of reducing the power consumption is small if the minimum luminance value is relatively large, thereby making it impossible to simultaneously realize a display which is easy to see and a low power consumption.

[0005] On the other hand, a method which successively decreases the luminance of the display part when no access is made to the information processing apparatus for a predetermined time and finally turns the display part OFF is proposed in a Japanese Laid-Open Patent Application No.5-188869, for example. But according to this proposed method, the luminance of the display part is automatically returned to the maximum luminance value when an access is made to the information processing apparatus, and for this reason, this proposed method had problems similar to those of the second method described above. In other words, the display is difficult to see if the maximum luminance value is set to a relatively small value, and the power consumption cannot be made small if the maximum luminance value is set to a relatively small value.

SUMMARY OF THE INVENTION

[0006] Accordingly, it is a general object of the present invention to provide a novel and useful display control method and information processing apparatus, in which the problems described above are eliminated.

[0007] Another and more specific object of the present invention to provide a display control method and an information processing apparatus which can reduce the power consumption without requiring a complicated operation and without making a display on a display part difficult to see.

[0008] Still another object of the present invention is to provide a display control method comprising a luminance adjusting step of gradually decreasing a luminance of a display part having a luminance adjusting function from a maximum luminance value to a minimum luminance value with lapse of time, even during an operation other than a luminance adjusting operation, in a display unit. According to the display control method of the present invention, it is possible to reduce the power consumption without requiring a complicated operation and without making a display on the display part difficult to see.

[0009] A further object of the present invention is to provide an information processing apparatus comprising a display part having a luminance adjusting function, and a luminance control part gradually decreasing a luminance of the display part from a maximum luminance value to a minimum luminance value with lapse of time, even during an operation other than a luminance adjusting operation. According to the information processing apparatus of the present invention, it is possible to reduce the power consumption without requiring a complicated operation and without making a display on the display part difficult to see.

[0010] Other objects and further features of the present invention will be apparent from the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG.1 is a system block diagram showing an important part of a first embodiment of an information processing apparatus according to the present invention;
FIG.2 is a diagram showing a luminance for a case where a setting part of a luminance control part is not operated;
FIG.3 is a diagram showing the luminance for a case where the setting part of the luminance control part is operated;
FIG.4 is a system block diagram showing an important part of a second embodiment of the information processing apparatus according to the present invention;
FIG.5 is a diagram showing a linear function that is used when gradually decreasing a luminance value;
FIG.6 is a diagram showing a non-linear function that is used when gradually decreasing the luminance value;
FIG.7 is a flow chart for explaining the operation of a controller;
FIG.8 is a flow chart for explaining the operation of the controller in a third modification of the second embodiment;
FIG.9 is a flow chart for explaining the operation of the controller in a fourth modification of the second embodiment; and
FIG.10 is a diagram for explaining a change in the luminance according to the fourth modification of the second embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] FIG.1 is a system block diagram showing an important part of a first embodiment of an information processing apparatus according to the present invention. This first embodiment of the information processing apparatus employs a first embodiment of a display control method according to the present invention. In addition, in this first embodiment of the information processing apparatus, the present invention is applied to a portable information processing apparatus. The portable information processing apparatus is a lap-top personal computer, a portable communication equipment or the like, for example.

[0013] In FIG.1, the information processing apparatus generally includes a display part 1, a luminance control part 3, and an information processing part 4. The display part 1 is made of a LCD, PDP, CRT or the like, and has a luminance adjusting function. This display part 1 displays display information received from the information processing part 4 based on luminance information received from the luminance control part 3. The luminance control part 3 includes a setting part which is provided with buttons, knobs, keys of the like for adjusting the luminance, and a controller which is made of a CPU or the like.

[0014] The controller of the luminance control part 3 has the functions of supplying to the display part 1 the luminance information that is dependent upon a luminance value set from the information processing part 4, and supplying to the display part 1 the luminance information for automatically decreasing the luminance of the display part 1 from a maximum luminance value to a minimum luminance value with a predetermined transition time. In addition, when an operation is made from the setting part of the luminance control part 3 to increase the luminance, this operation is notified to the information processing part 4, and the controller of the luminance control part 3 also has the function of automatically updating the minimum luminance value to a luminance value at the time when this operation is made in response to luminance setting information from the information processing part 4.

[0015] The information processing part 4 supplies display information to the display part 1 based on an input made from an input device (not shown) such as a keyboard, and supplies to the luminance control part 3 the luminance setting information related to the luminance value that is set from the input device or the setting part described above. The maximum luminance value and the minimum luminance value may be set in advance or, set in the luminance control part 3 via the information processing part 4 based on an input made from the input device. In addition, the predetermined transition time described above may also be set in advance or, set in the luminance control part 3 via the information processing part 4 based on an input made from the input device.

[0016] The display part 1 may be realized by a display part having a known construction, and the information processing part 4 may be realized by an information processing part having a known construction. This embodiment is characterized by the process of the controller of the luminance control part 3.

[0017] FIGS.2 and 3 respectively are diagrams for explaining the operation of the luminance control part 3. In FIGS.2 and 3, the ordinate indicates a luminance value that is displayed on the display part 1 based on the luminance information output from the luminance control part 3, and the abscissa indicates the time. In addition, K1 indicates the maximum luminance value, and K2 indicates the minimum luminance value.

[0018] FIG.2 shows the luminance for a case where the setting part of the luminance control part 3 is not operated. In this case, it is assumed for the sake of con-

venience that the luminance of the display part 1 decreases to the minimum luminance value K2 in a predetermined transition time T1 from a time ta to a time tb, regardless of the operation of the input device, that is, regardless of whether or not an access is made to the information processing part 4. For example, the time ta corresponds to the time when the power supply of the information processing apparatus is turned ON. Because the luminance of the display part 1 automatically and gradually decreases with the lapse of time, it is possible to gradually reduce the power consumption of the display part 1 without making the display difficult to see such that the user will feel uncomfortable or unpleasant.

[0019] FIG.3 shows the luminance for a case where the setting part of the luminance control part 3 is operated. In this case, it is assumed for the sake of convenience that the luminance of the display part 1 gradually decreases from the time ta, regardless of whether or not an access is made to the information processing part 4, and that the luminance value is increased to K3 by the setting part at a time tc when the user detects that the luminance has decreased too much. It is also assumed that the luminance value at the time when the luminance value is increased to K3 by the setting part, that is, the luminance value immediately prior to increasing the luminance value, is K2A. The minimum luminance value set in the controller of the luminance control part 3 is updated to this luminance value K2A. Accordingly, after the time tc, the luminance of the display part 1 gradually decreases from the luminance value K2A, and decreases to the updated minimum luminance value K2A by a time tb'.

[0020] Therefore, when the user makes an operation to increase the luminance, the luminance value will not decrease to a value smaller than the luminance value at the time when this operation is made. For this reason, the display is made with a minimum luminance value which suits the user's needs or preference, and it is possible to gradually reduce the power consumption of the display part 1 without making the display difficult to see such that the user will feel uncomfortable or unpleasant.

[0021] Next, a description will be given of a second embodiment of the information processing apparatus according to the present invention. FIG.4 is a system block diagram showing an important part of the second embodiment of the information processing apparatus. This second embodiment of the information processing apparatus employs a second embodiment of the display control method according to the present invention. In this second embodiment of the information processing apparatus, the present invention is applied to a portable information processing apparatus which uses a LCD having a back light part. In FIG.4, those parts which are the same as those corresponding parts in FIG.1 are designated by the same reference numerals, and a description thereof will be omitted.

[0022] In FIG.4, the display part 1 has a known construction including a LCD 11 and a back light part 12. The back light part 12 has a fluorescent lamp 13 and a fluorescent lamp power supply 14. The luminance control part 3 includes a controller 31 which is made up of a CPU or the like and has a memory 31a, and a setting part 32 which has buttons, knobs, keys or the like for adjusting the luminance. In addition, the information processing part 4 has a known construction including an input/output (I/O) interface 41, a CPU 42, a memory 43 and a display controller 44 which are coupled via a bus 40. The controller 31 is coupled to the fluorescent lamp power supply 14. The setting part 32 is coupled to the controller 31. Furthermore, the setting part 32 and a keyboard 7 are respectively coupled to the I/O interface 41, and the I/O interface 41 is coupled to the controller 31. The display controller 44 is coupled to the LCD 11.

[0023] The controller 31 supplies luminance information to the fluorescent lamp power supply 14, and controls the luminance of the fluorescent lamp 13. For example, in a case where the luminance of the fluorescent lamp 13 is controlled by an output voltage of the fluorescent lamp power supply 14, the fluorescent lamp power supply 14 may be formed by a digital-to-analog (D/A) converter. The LCD 11 makes a display based on display information tat is obtained from the display controller 44, and the luminance of the display is controlled by the fluorescent lamp 13.

[0024] The maximum luminance value, the minimum luminance value, the predetermined transition time, a function that is used to gradually decrease the luminance value, and the like are stored within the memory 31a of the controller 31. FIGS.5 and 6 respectively are diagrams showing functions used to gradually decrease the luminance value. In FIGS.5 and 6, the ordinate indicates the luminance, and the abscissa indicates the time. FIG.5 shows a case where the function is linear, and a slope of this function can be set arbitrarily. On the other hand, FIG.6 shows a case where the function is non-linear, and a curve of this function can also be set arbitrarily. In addition, it is also possible to store one function in the memory 31a or, to store a plurality of functions in the memory 31a and select one of the stored functions in response to an instruction input from the keyboard 7.

[0025] Information input from the keyboard 7 or information input from an external unit is supplied to the CPU 42 via the I/O interface 41 within the information processing part 4, and display information is supplied from the CPU 42 to the LCD 11 via the display controller 44. In addition, in a case where a luminance value is set from the keyboard 7, luminance setting information related to this luminance value is supplied to the controller 31 via the I/O interface 41 under the control of the CPU 42. In a case where a luminance value is set by operating the setting part 32, a notification related to this operation is made from the setting part 32 to the CPU 42 via the I/O interface 41, and the CPU 42 supplies luminance setting information dependent upon this notifica-

tion to the controller 31 via the I/O interface 41. For example, the memory 43 is made of a ROM which stores programs to be executed by the CPU 42, and a RAM which stores intermediate results of operations carried out by the CPU 42 and the like. The display controller 44 controls the display on the LCD 11 depending on horizontal and vertical scanning frequencies which are set, under the control of the CPU 42.

[0026] Of course, it is possible to omit the setting part 32, and to provide the functions of the setting part 32 in the keyboard 7.

[0027] FIG.7 is a flow chart for explaining the operation of the controller 31. In FIG.7, a step S1 sets in the memory 31a a luminance initial value, that is, the maximum luminance value, based on the luminance setting information from the information processing part 4. A step S2 decides whether or not to decrease the luminance value based on the function stored in the memory 31a. If the decision result in the step S2 is NO, a step S3 decides whether or not the luminance is adjusted by the operation of the setting part 32. If the decision result in the step S3 is NO, the process returns to the step S2.

[0028] If the decision result in the step S2 is YES, a step S4 decides whether or not the luminance value is the minimum luminance value stored in the memory 31a, and the process advances to the step S3 described above if the decision result in the step S4 is YES. On the other hand, if the decision result in the step S4 is NO, a step S5 decreases the luminance based on the function which is shown in FIG.5 or FIG.6 and is stored in the memory 31a, and the process thereafter advances to the step S3.

[0029] In addition, if the decision result in the step S3 is YES, a step S6 automatically updates the minimum luminance value that is stored in the memory 31a to the present luminance value. A step S7 increases the luminance to a luminance value set by the user depending on the operation of the setting part 32, and the process thereafter returns to the step S2.

[0030] In the step S2, it is also possible to decide whether or not to decrease the luminance value based on power supply information supplied to the I/O interface 41 from the external unit, instead of deciding whether or not to decrease the luminance value based on the function stored in the memory 31a.

[0031] In a first modification of the second embodiment, the step S2 decides whether or not to decrease the luminance value based on whether or not the power supply of the LCD 11, that is, the power supply of the information processing apparatus, is a battery. It is possible to detect by a known means whether or not the power supply of the information processing apparatus is a battery or an A.C. power supply. Hence, this first modification decides whether or not to decrease the luminance value by deciding whether or not the power supply is a battery, based on the power supply information received by the I/O interface 41 from the external unit.

[0032] In a second modification of the second embodiment, the step S2 decides whether or not to decrease the luminance value based on whether or not the power supply of the LCD 11, that is, the power supply of the information processing apparatus, is a battery, and a remaining capacity of the battery is less than or equal to a predetermined value. It is possible to detect by a known means the remaining capacity of the battery which is used as the power supply of the information processing apparatus. Thus, this second modification decides whether or not to decrease the luminance value by deciding whether or not the remaining capacity of the battery which is used as the power supply is less than or equal to the predetermined value, based on the power supply information received by the I/O interface 41 from the external unit.

[0033] In a third modification of the second embodiment, the step S2 decides whether or not to decrease the luminance value based on whether or not the power supply of the LCD 11, that is, the power supply of the information processing apparatus, is an A.C. power supply. It is possible to detect by a known means whether or not the power supply of the information processing apparatus is an A.C. power supply. Hence, this third modification decides whether or not to decrease the luminance value by deciding whether or not the power supply is an A.C. power supply, based on the power supply information received by the I/O interface 41 from the external unit.

[0034] In the case of this third modification, the step S2 shown in FIG.7 is made up of steps S21 and S22 shown in FIG.8. The step S21 decides whether or not the power supply is an A.C. power supply based on the power supply information, and the process advances to the step S4 if the decision result in the step S21 is NO. On the other hand, if the decision result in the step S21 is YES, the step S22 fixes the luminance to a luminance value greater than the minimum luminance value stored in the memory 31a because the power consumption does not become a big problem while the A.C. power supply is being used, and the process advances to the step S3.

[0035] In a fourth modification of the second embodiment, the step S2 decides whether or not to decrease the luminance value based on whether or not the power supply of the LCD 11, that is, the power supply of the information processing apparatus, is a battery, and a remaining capacity of the battery is less than or equal to a predetermined value. In addition, the step S2 updates the minimum luminance value to a smaller value when the remaining capacity of the battery becomes less than or equal to the predetermined value, so as to prevent wear of the battery having a remaining capacity that is small. As described above, the remaining capacity of the battery which is used as the power supply of the information processing apparatus can be detected by a known means. Accordingly, this fourth modification decides whether or not to decrease the luminance value

by deciding whether or not the remaining capacity of the battery which is use as the power supply is less than or equal to the predetermined value, based on the power supply information received by the I/O interface 41 from the external unit, and updates the minimum luminance value to the smaller value when the remaining capacity of the battery becomes less than or equal to the predetermined value.

[0036] In the case of this fourth modification, the step S2 shown in FIG.7 is made up of steps S21 through S24 shown in FIG.9. In FIG.9, those steps which are the same as those corresponding steps in FIG.8 are designated by the same reference numerals, and a description thereof will be omitted. In the case shown in FIG.9, if the decision result in the step S21 is NO, a step S23 decides whether or not the remaining capacity of the battery is less than or equal to the predetermined value based on the power supply information, and the process advances to the step S4 if the decision result in the step S23 is NO. On the other hand, if the decision result in the step S23 is YES, a step S24 updates the minimum luminance value stored in the memory 31a to the smaller value, and the process thereafter advances to the step S4.

[0037] FIG.10 is a diagram for explaining a change in the luminance according to the fourth modification of the second embodiment. In FIG.10, the ordinate indicates the luminance, and the abscissa indicates the time. For the sake of convenience, it is assumed that the power supply of the information processing apparatus is switched from the battery to the A.C. power supply at a time tx when the luminance reaches the minimum luminance value K2 after gradually decreasing from the maximum luminance value K1 depending on a non-linear function. In addition, it is also assumed that the remaining capacity of the battery becomes less than or equal to the predetermined value at a time ty while the battery is being used as the power supply of the information processing apparatus. In this fourth modification, the luminance is fixed to a luminance value K3 (K3 > K2) at the time tx, and the minimum luminance value K2 is updated to a luminance value K4 (K4 < K2) at the time ty, as described above in conjunction with FIG.9.

[0038] Further, the present invention is not limited to these embodiments, but various variations and modifications may be made without departing from the scope of the present invention.

Claims

1. A display control method, characterized by a luminance adjusting step of gradually decreasing a luminance of a display part having a luminance adjusting function from a maximum luminance value to a minimum luminance value with lapse of time, even during an operation other than a luminance adjusting operation, in a display unit.

2. The display control method as claimed in claim 1, characterized by further including a setting step of setting at least one of the maximum luminance value and the minimum luminance value.

3. The display control method as claimed in claim 1 or 2, characterized by further including an updating step of automatically updating the minimum luminance value to a luminance value at a time of a luminance adjusting operation that is made to increase the luminance of the display part.

4. The display control method as claimed in any of claims 1 to 3, characterized in that said luminance adjusting step decreases the luminance of the display part depending on a linear or non-linear function.

5. The display control method as claimed in any of claims 1 to 4, characterized in that said luminance adjusting step decreases the luminance of the display part only in a state where the display part is driven by a battery.

6. The display control method as claimed in any of claims 1 to 4, characterized in that said luminance adjusting step decreases the luminance of the display part when a remaining capacity of a battery which drives the display part becomes less than or equal to a predetermined value.

7. The display control method as claimed in any of claims 1 to 4, characterized in that said luminance adjusting step fixes the luminance of the display part to a luminance value greater than the minimum luminance value in a state where the display part is driven by a driving source other than a battery.

8. The display control method as claimed in any of claims 1 to 7, characterized in that the display part is selected from a group comprising a liquid crystal display having a back light part, a plasma display panel (PDP) and a CRT.

9. An information processing apparatus comprising a display part (1) having a luminance adjusting function, characterized in that there is provided: a luminance control part (3) gradually decreasing a luminance of said display part (1) from a maximum luminance value to a minimum luminance value with lapse of time, even during an operation other than a luminance adjusting operation.

10. The information processing apparatus as claimed in claim 9, characterized by further comprising setting means (7, 4; 32) for setting at least one of the maximum luminance value and the minimum luminance value.

11. The information processing apparatus as claimed in claim 9 or 10, characterized in that said luminance control part (3) includes updating means (31) for automatically updating the minimum luminance value to a luminance value at a time of a luminance adjusting operation that is made to increase the luminance of the display part (1).

12. The information processing apparatus as claimed in any of claims 9 to 11, characterized in that said luminance control part (3) decreases the luminance of the display part (1) depending on a linear or non-linear function.

13. The information processing apparatus as claimed in any of claims 9 to 12, characterized in that said luminance control part (3) includes control means (4) for decreasing the luminance of the display part (1) only in a state where the display part is driven by a battery.

14. The information processing apparatus as claimed in any of claims 9 to 12, characterized in that said luminance control part (2) includes control means (4) for decreasing the luminance of the display part (1) when a remaining capacity of a battery which drives the display part becomes less than or equal to a predetermined value.

15. The information processing apparatus as claimed in any of claims 9 to 12, characterized in that said luminance control part (3) includes control means (4) for fixing the luminance of the display part (1) to a luminance value greater than the minimum luminance value in a state where the display part is driven by a driving source other than a battery.

16. The information processing apparatus as claimed in any of claims 9 to 15, characterized in that said display part (1) is selected from a group comprising a liquid crystal display having a back light part, a plasma display panel (PDP) and a CRT.

FIG. 1

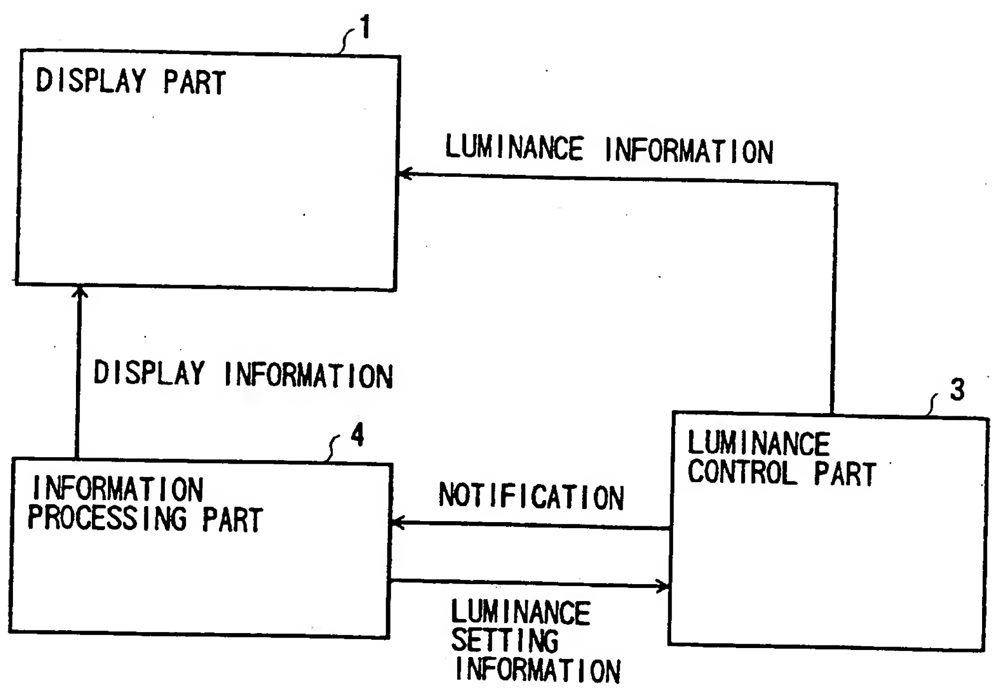

1
DISPLAY PART
LUMINANCE INFORMATION
DISPLAY INFORMATION
3
4
LUMINANCE CONTROL PART
INFORMATION PROCESSING PART
NOTIFICATION
LUMINANCE SETTING INFORMATION

FIG. 2

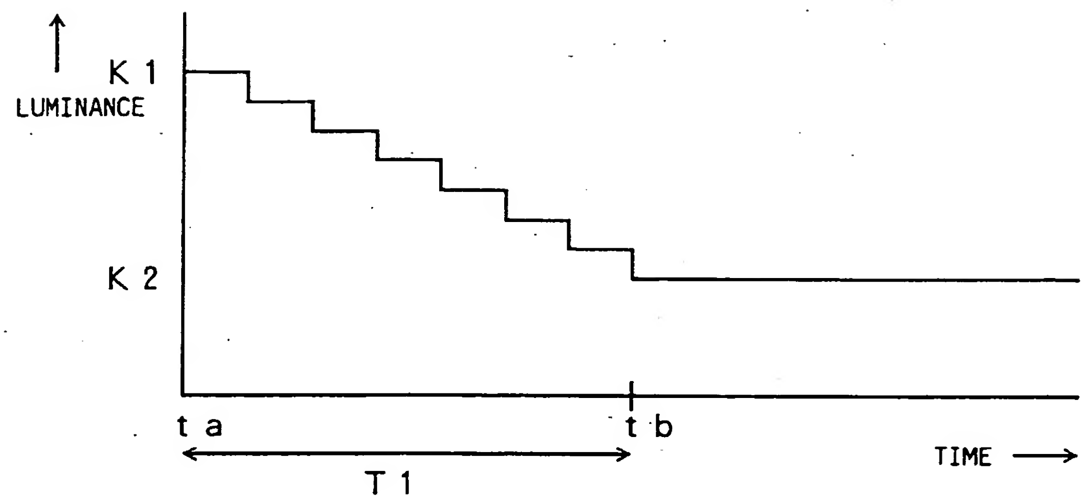


FIG. 3

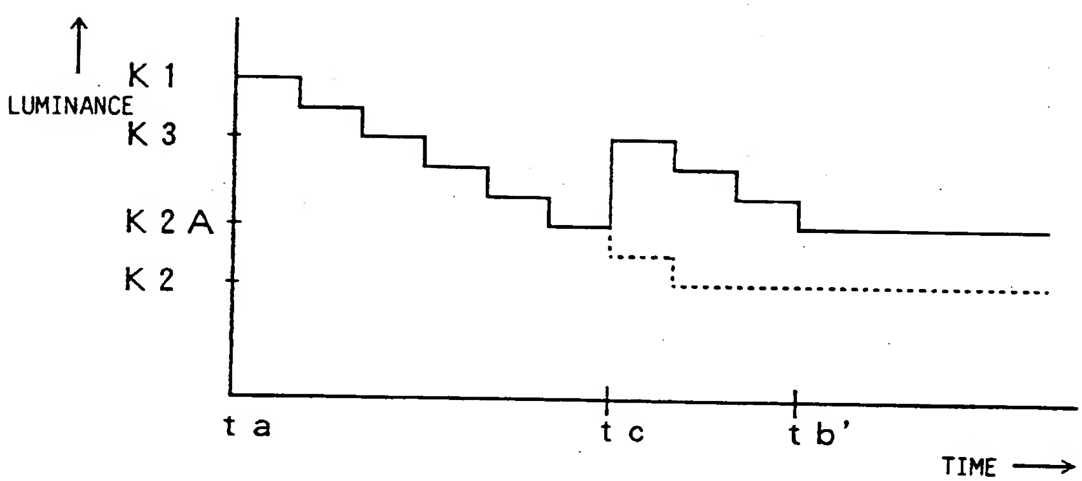


FIG. 4

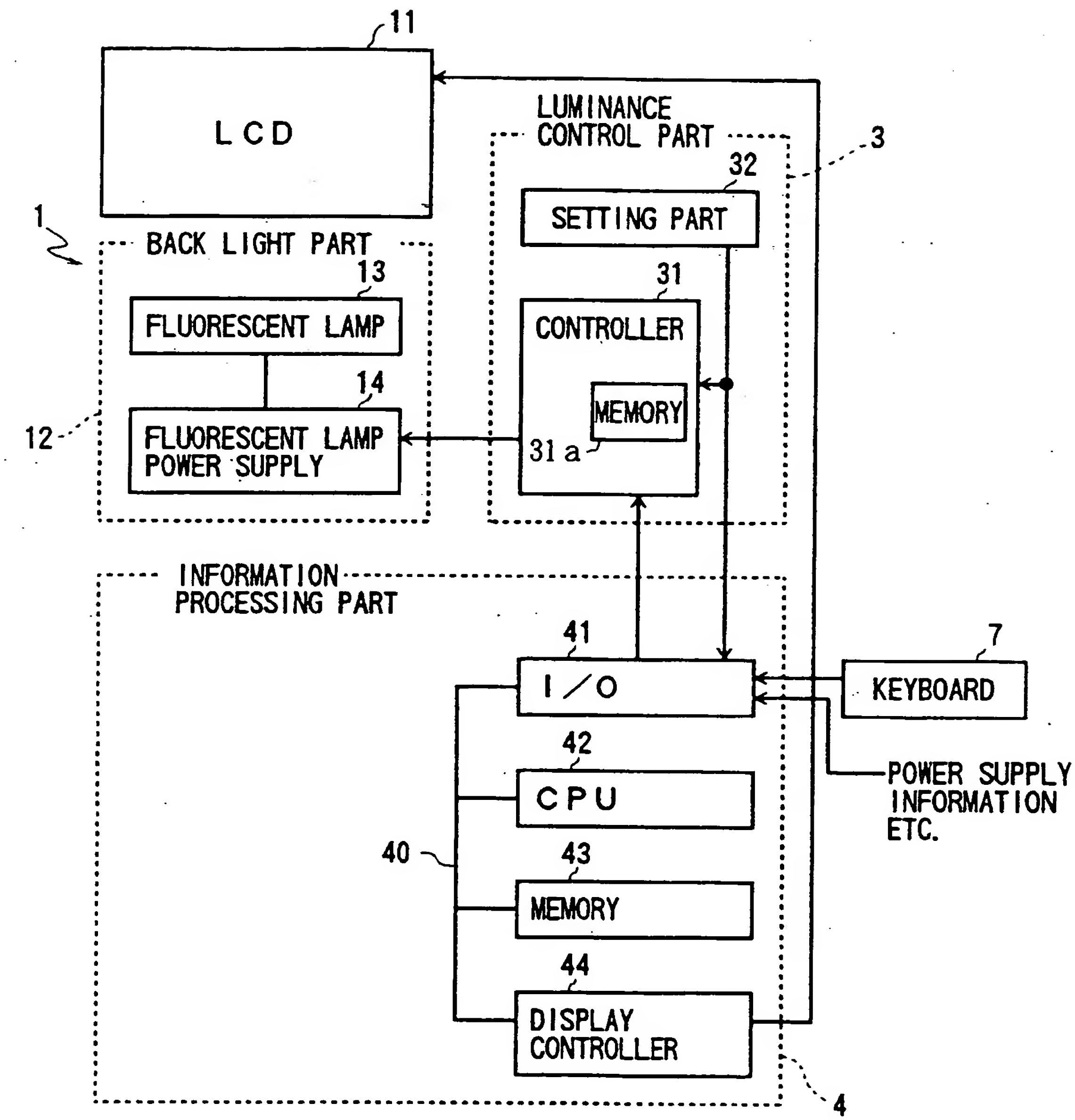

11
LCD
LUMINANCE CONTROL PART
3
32
SETTING PART
1
BACK LIGHT PART
13
FLUORESCENT LAMP
31
CONTROLLER
14
MEMORY
12
FLUORESCENT LAMP POWER SUPPLY
31 a
INFORMATION PROCESSING PART
41
7
I／O
KEYBOARD
42
POWER SUPPLY INFORMATION ETC.
CPU
40
43
MEMORY
44
DISPLAY CONTROLLER
4

FIG. 5

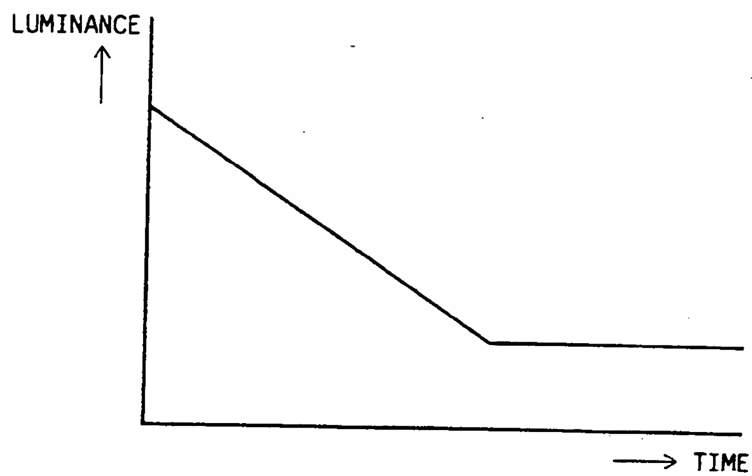


FIG. 6

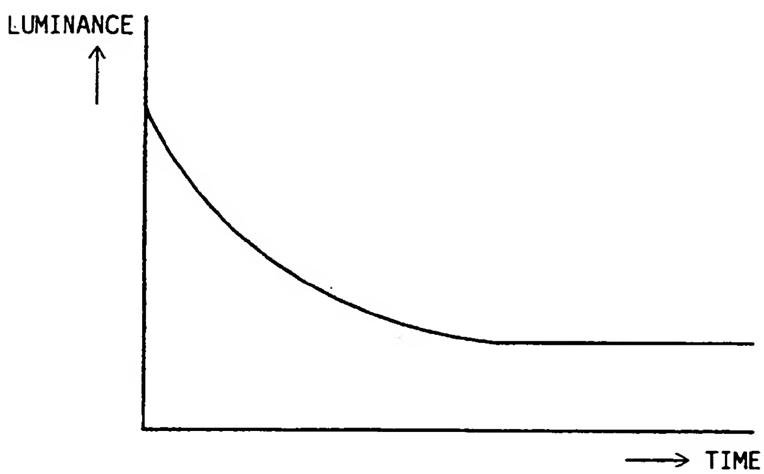


FIG. 7

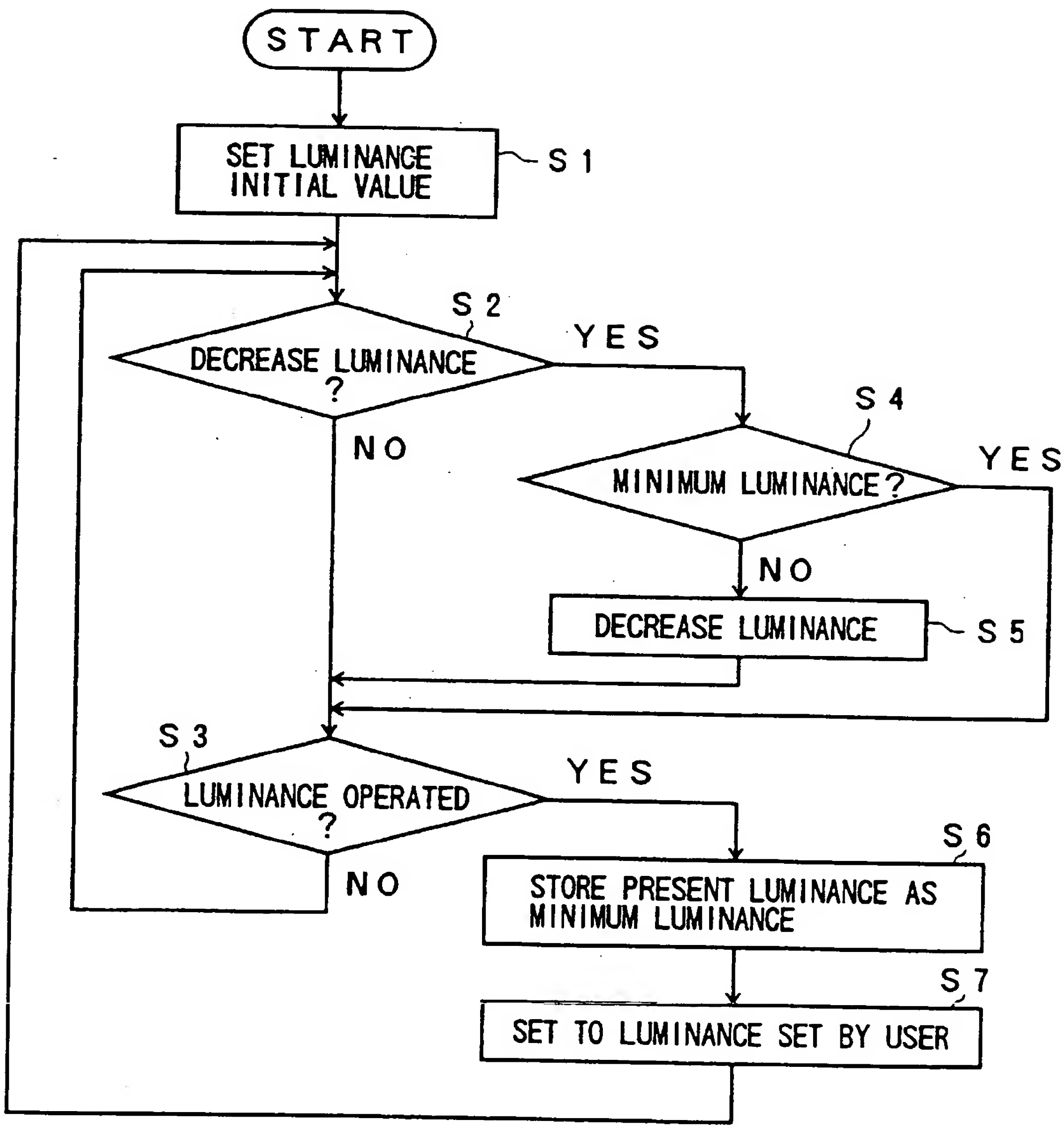

START
SET LUMINANCE INITIAL VALUE
S 1
S 2
DECREASE LUMINANCE ?
YES
NO
S 4
MINIMUM LUMINANCE ?
YES
NO
DECREASE LUMINANCE
S 5
S 3
LUMINANCE OPERATED ?
YES
NO
S 6
STORE PRESENT LUMINANCE AS MINIMUM LUMINANCE
S 7
SET TO LUMINANCE SET BY USER

FIG. 8

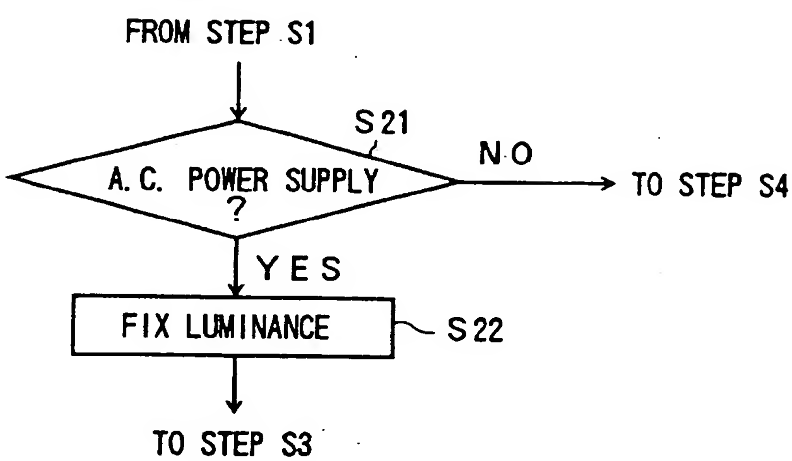

FROM STEP S1
S21
A. C. POWER SUPPLY ?
NO
TO STEP S4
YES
FIX LUMINANCE
S22
TO STEP S3

FIG. 9

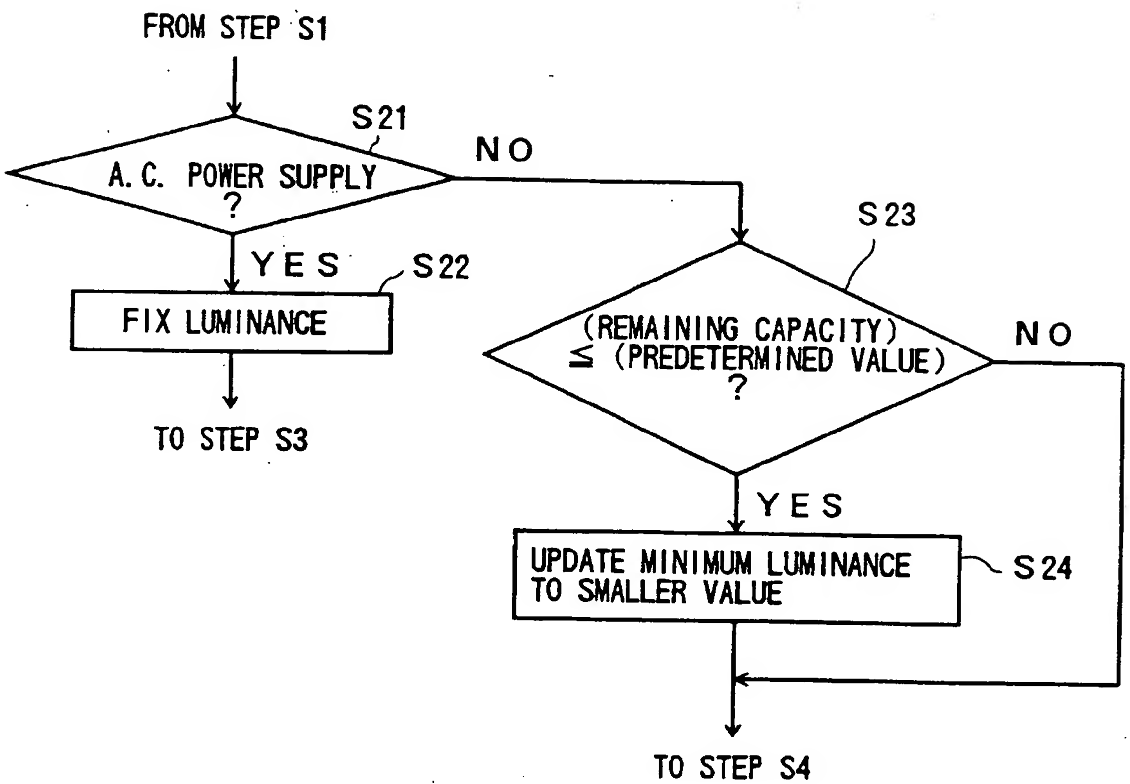
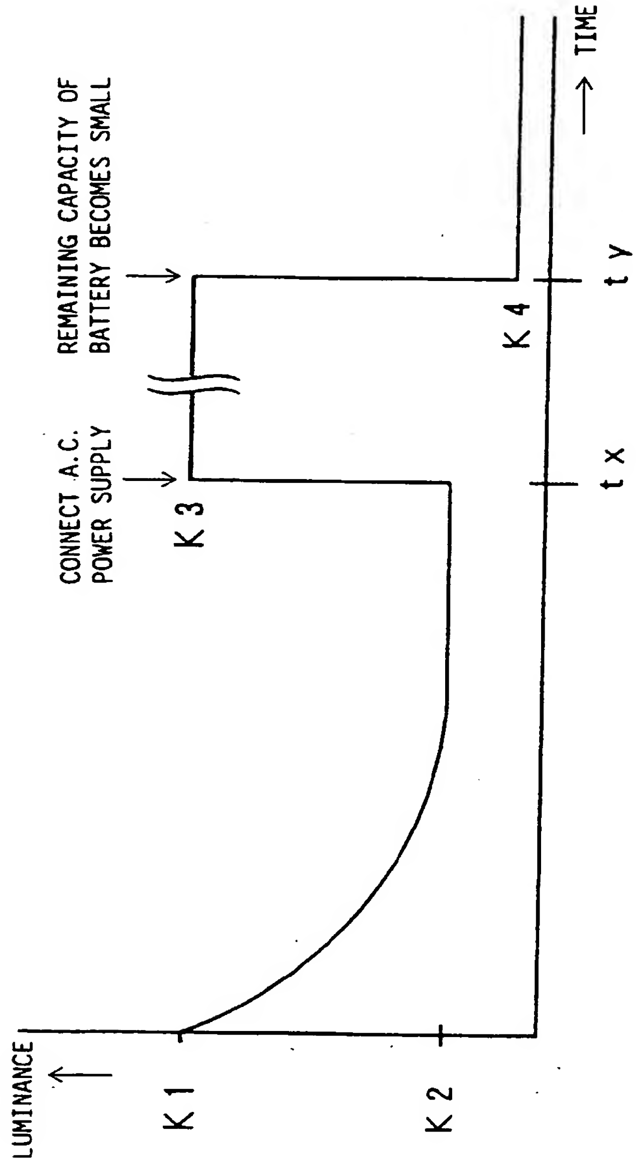

FROM STEP S1
S21
A. C. POWER SUPPLY ?
NO
YES
S22
FIX LUMINANCE
TO STEP S3
S23
(REMAINING CAPACITY) ≤ (PREDETERMINED VALUE) ?
NO
YES
UPDATE MINIMUM LUMINANCE TO SMALLER VALUE
S24
TO STEP S4

FIG. 10


LUMINANCE
K 1
K 2
CONNECT A.C. POWER SUPPLY
K 3
REMAINING CAPACITY OF BATTERY BECOMES SMALL
K 4
t x
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TIME

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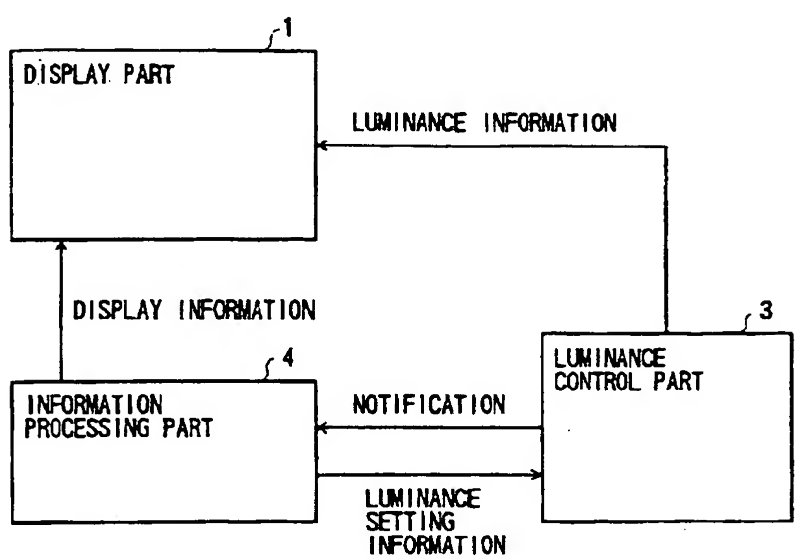
(54) **Display control method and information processing apparatus**

(57) In a display unit, a luminance of a display part (1) having a luminance adjusting function is gradually decreased from a maximum luminance value to a minimum luminance value with lapse of time, even during an operation other than a luminance adjusting operation.

FIG. 1



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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X A	US 5 636 041 A (PEARCE JOHN J ET AL) 3 June 1997 (1997-06-03) * column 2, line 1 - line 8 * * column 3, line 1 - line 32 * * figures 2,3 *	1,2,4, 8-10,12, 16 3,11	G09G5/10 G09G3/20 G09G3/34
X,D	PATENT ABSTRACTS OF JAPAN vol. 017, no. 611 (P-1641), 10 November 1993 (1993-11-10) & JP 05 188869 A (SHARP CORP), 30 July 1993 (1993-07-30) * abstract *	1,4,9,12	
A	US 5 384 516 A (GOTO MAKOTO ET AL) 24 January 1995 (1995-01-24) * column 29, line 37 - column 30, line 39 *	1,6,7,9, 14,15	
A	EP 0 404 182 A (TOKYO SHIBAURA ELECTRIC CO) 27 December 1990 (1990-12-27) * column 11, line 5 - column 12, line 9 * * figure 4 *	1,9	TECHNICAL FIELDS SEARCHED (Int.Cl.6) G09G
E	EP 0 841 652 A (FUJITSU LTD) 13 May 1998 (1998-05-13) * column 2, line 20 - line 31 * * column 6, line 53 - column 7, line 25 * * figure 4 *	1,2,4,9, 10,12	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 April 2000	Farricella, L

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EP 98 30 1219

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06-04-2000

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
US 5636041	A	03-06-1997	NONE			
JP 05188869	A	30-07-1993	JP	2818915	B	30-10-1998
US 5384516	A	24-01-1995	JP	5242987	A	21-09-1993
EP 0404182	A	27-12-1990	JP	3027420	A	05-02-1991
			JP	3027438	A	05-02-1991
			DE	69026428	D	15-05-1996
			DE	69026428	T	12-09-1996
			KR	9309780	B	11-10-1993
			US	5293494	A	08-03-1994
EP 0841652	A	13-05-1998	JP	2900997	B	02-06-1999
			JP	10187084	A	14-07-1998

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